CLAIMS

1. A pneumatic bilge liquid removal system for a vessel having a bilge with bilge liquid therein, said system comprising:

an air compressor having inlet and outlet ports pneumatically coupled to a valve system;

a collection chamber having top and bottom segments, said top segment pneumatically coupled to said valve system;

at least one collection tube extending from said bilge to said top segment of said collection chamber without one or more intervening valves;

a discharge tube coupled to said bottom segment of said collection chamber and having a one-way valve therein;

a control system means for energizing said air compressor and controlling said valve system such that said air compressor pressurizes said collection chamber via said outlet port for a first predetermined time interval causing said bilge liquid in said collection chamber to discharge through said discharge tube; and such that said air compressor creates a negative pressure in said collection chamber via said inlet port for a second predetermined time interval causing any said bilge liquid in said bilge to be drawn into and accumulate in said collection chamber via said at least one collection tube.

2. A bilge liquid removal system as claimed in claim 1 wherein said at least one collection tube is a non-collapsible tube having a cross-sectional area sufficiently small such that both liquid and a combination of liquid and gas are capable of being transported through said collection tube into said collection chamber when said air compressor is actuated.

3. A bilge liquid removal system as claimed in claim 1 wherein said at least one collection tube is a non-collapsible tube having a cross-sectional area that is a function of the capacity of said air compressor.

4. A bilge liquid removal system as claimed in claim 1 wherein said at least one collection tube has an overall length of between 20 feet and 150 feet.

5. A bilge liquid removal system as claimed in claim 1 wherein said control system means is an electric control system.

6. A bilge liquid removal system as claimed in claim 5 wherein said electric control system includes programmable electronics and said valve system includes electrically controlled valves controlled by said electric control system.

7. A bilge liquid removal system as claimed in claim 6 wherein said electrically controlled valves are solenoid valves.

8. A bilge liquid removal system as claimed in claim 1 further comprising a collector plate coupled to said at least one collection tube at said bilge, said collector plate including a substantially downwardly facing surface defining bilge liquid collection channels converging at a common area near said collection tube.

9. A bilge liquid removal system as claimed in claim 8 wherein said collector plate includes a filter disposed on said downwardly facing surface such that said bilge liquid is filtered prior to removal through said collection channels and said collection tube.

10. A bilge liquid removal system as claimed in claim 9 wherein said downwardly facing surface of said collector plate defines one of a shape from the group of a planar shape, an angular shape, and a ski shape.

11. A bilge liquid removal system as claimed in claim 1 wherein said discharge tube is adapted to permit discharge of bilge liquid outside of said vessel.

12. A bilge liquid removal system as claimed in claim 1 wherein said inlet and outlet ports of said air compressor are pneumatically coupled to said valve system via respective vacuum and pressurization tubes.

13. A bilge liquid removal system for removing bilge liquid from a bilge of a vessel, the removal system comprising:

a primary bilge system including a bilge pump having a bilge liquid intake extending to the bilge of a vessel and a bilge liquid discharge for removing bilge liquid from said bilge via said bilge liquid intake and said pump to a location outside of the vessel;

a secondary pneumatic bilge liquid removal system comprising

an air compressor having inlet and outlet ports pneumatically coupled to a valve system;

a collection chamber having top and bottom segments, said top segment pneumatically coupled to said valve system;

at least one collection tube extending from said bilge to said top segment of said collection chamber without intervening valves;

a discharge tube coupled to said bottom segment of said collection chamber and having a one-way valve therein; and

a control system means adapted to operate in conjunction with said primary bilge system, said control system means for energizing said air compressor and controlling said valve system such that said air compressor pressurizes said collection chamber via said outlet

port for a first predetermined time interval causing said bilge liquid in said collection chamber to discharge through said discharge tube; and such that said air compressor creates a negative pressure in said collection chamber via said inlet port for a second predetermined time interval causing any said bilge liquid in said bilge to be drawn into and accumulate in said collection chamber via said at least one collection tube.

14. A bilge liquid removal system as claimed in claim 13 wherein said at least one collection tube is a non-collapsible tube having a cross-sectional area sufficiently small such that both liquid and a combination of liquid and gas are capable of being transported through said collection tube into said collection chamber when said air compressor is actuated.

15. A bilge liquid removal system as claimed in claim 13 wherein said at least one collection tube is a non-collapsible tube having a cross-sectional area that is a function of the capacity of said air compressor.

16. A bilge liquid removal system as claimed in claim 13 wherein said at least one collection tube has an overall length of between 20 feet and 150 feet.

17. A bilge liquid removal system as claimed in claim 13 wherein said control system means is an electric control system.

18. A bilge liquid removal system as claimed in claim 17 wherein said electric control system includes programmable electronics and said valve system includes electrically controlled valves controlled by said electric control system.

19. A bilge liquid removal system as claimed in claim 18 wherein said electrically controlled valves are solenoid valves.

20. A bilge liquid removal system as claimed in claim 13 further comprising a collector plate coupled to said at least one collection tube at said bilge, said collector plate including a substantially downwardly facing surface defining bilge liquid collection channels converging at a common area near said collection tube.

21. A bilge liquid removal system as claimed in claim 20 wherein said collector plate includes a filter disposed on said downwardly facing surface such that said bilge liquid is filtered prior to removal through said collection channels and said collection tube.

22. A bilge liquid removal system as claimed in claim 21 wherein said downwardly facing surface of said collector plate defines one of a shape from the group of a planar shape, an angular shape, and a ski shape.

23. A bilge liquid removal system as claimed in claim 13 wherein said discharge tube is adapted to permit discharge of bilge liquid outside of said vessel.

24. A bilge liquid removal system as claimed in claim 13 wherein said inlet and outlet ports of said air compressor are pneumatically coupled to said valve system via respective vacuum and pressurization tubes.

25. In combination with a primary bilge system, the primary bilge system including a bilge pump having a bilge liquid intake located in the bilge of a vessel and a bilge liquid discharge for removing bilge liquid via said bilge liquid intake and said pump to a location out of the vessel; a secondary pneumatic bilge liquid removal system for said vessel comprising:

an air compressor having inlet and outlet ports pneumatically coupled to a valve system;

a collection chamber having top and bottom segments, said top segment pneumatically coupled to said valve system;

at least one collection tube extending from said bilge to said top segment of said collection chamber without intervening valves;

a discharge tube coupled to said bottom segment of said collection chamber and having a one-way valve therein;

a control system means adapted to operate in conjunction with said primary bilge system, said control system means for energizing said air compressor and controlling said valve system such that said air compressor pressurizes said collection chamber via said outlet port for a first predetermined time interval causing said bilge liquid in said collection chamber to discharge through said discharge tube; and such that said air compressor creates a negative pressure in said collection chamber via said inlet port for a second predetermined time interval causing said bilge liquid in said bilge to be drawn into and accumulate in said collection chamber via said at least one collection tube.

26. A secondary pneumatic bilge liquid removal system as claimed in claim 25 wherein said at least one collection tube is a non-collapsible tube having a cross-sectional area sufficiently small such that both liquid and a combination of liquid and gas are capable of being transported through said collection tube into said collection chamber when said air compressor is actuated.

27. A secondary pneumatic bilge liquid removal system as claimed in claim 25 wherein said at least one collection tube is a non-collapsible tube having a cross-sectional area that is a function of the capacity of said air compressor.

28. A secondary pneumatic bilge liquid removal system as claimed in claim 25 wherein said at least one collection tube has an overall length of between 20 feet and 150 feet.

29. A secondary pneumatic bilge liquid removal system as claimed in claim 25 wherein said control system means is an electric control system.

30. A secondary pneumatic bilge liquid removal system as claimed in claim 29 wherein said electric control system includes programmable electronics and said valve system includes electrically controlled valves controlled by said electric control system.

31. A secondary pneumatic bilge liquid removal system as claimed in claim 30 wherein said electrically controlled valves are solenoid valves.

32. A secondary pneumatic bilge liquid removal system as claimed in claim 25 further comprising a collector plate coupled to said at least one collection tube at said bilge, said collector plate including a substantially downwardly facing surface defining bilge liquid collection channels converging at a common area near said collection tube.

33. A secondary pneumatic bilge liquid removal system as claimed in claim 32 wherein said collector plate includes a filter disposed on said downwardly facing surface such that said bilge liquid is filtered prior to removal through said collection channels and said collection tube.

34. A secondary pneumatic bilge liquid removal system as claimed in claim 33 wherein said downwardly facing surface of said collector plate defines one of a shape from the group of a planar shape, an angular shape, and a ski shape.

35. A secondary pneumatic bilge liquid removal system as claimed in claim 25 wherein said discharge tube is adapted to permit discharge of bilge liquid outside of said vessel.

36. A secondary pneumatic bilge liquid removal system as claimed in claim 25 wherein said inlet and outlet ports of said air compressor are pneumatically coupled to said valve system via respective vacuum and pressurization tubes.

37. A method for removing bilge liquid from the bilge of a vessel, the method comprising:

providing a bilge liquid collection chamber with upper and lower regions;

providing at least one small diameter collection tube extending from said bilge to said upper region of said collection chamber;

providing a discharge port at said lower region of said collection chamber with a one way valve limiting flow solely for discharge;

negatively pressurizing said bilge liquid collection chamber and said at least one collection tube through to said bilge;

drawing said bilge liquid into said collection chamber via said at least one collection tube for a predetermined suction time interval;

thereafter positively pressurizing said collection chamber and discharging said bilge liquid therefrom via said discharge tube while permitting nominal flow through said at least one collection tube.

38. A method for removing bilge liquid from the bilge of a vessel as claimed in claim 37 wherein said positively pressurizing said collection chamber and said discharging said bilge liquid steps occur prior in time to said negatively pressurizing said collection chamber and said drawing said bilge liquid steps.

39. A method for removing bilge liquid from the bilge of a vessel as claimed in claim 38 further comprising controlling said negatively pressurizing, drawing, positively pressurizing and discharging steps via an electric control system which energizes electric valves pneumatically connected to an air compressor and said collection chamber.